

**ABSTRACT OF THE INVENTION**

**[0050]** Broadband access is provided to a virtual private network (VPN), including multiple local area networks (LANs) configured to interface with an IPv6 service provider network. Data to be routed from an originating device in an originating LAN to a destination device in a destination LAN is received by an ingress line interface and encapsulated in an IPv6 packet. A unique identification number assigned to the VPN is added to the IPv6 packet. When the destination device's address is not mapped to a corresponding egress line interface, the IPv6 packet is broadcast to a multicast address associated with the VPN. When the destination device's address is mapped to the egress line interface, the IPv6 packet is unicast to the egress line interface. The data is ultimately received and decapsulated by the egress line interface. After the VPN identification number is verified, the data is transmitted to the destination device.